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Preface

Being an Air Force Civil Engineer, I chose the subject of AFRICOM because I was interested in how its new engineering staff would be employed and the focus of its new mission. After speaking with some of those involved in developing the new joint engineering staff, it was apparent that they too were not quite sure what direction this small staff would take. I decided I would take a stab at proposing a direction. Water is a fundamental need of life and a major sacrament in many religions. Water's importance in sustaining life and its involvement in most of life's activities is greatly overlooked. I wanted to research water's ability to influence stability in Africa.

I want to thank those that helped me accomplish this endeavor. First I want to thank my Lord and Savior, Jesus Christ, for giving me the ability to balance work, family, and my faith. Second I want to thank my family; my wife Lisa and our two sons, Connor and Colton, sacrificed their previous year to the military with my absence in Korea. This year they did the same for my time spent at the Marine Corps Command and Staff College completing this paper and many others. I also want to thank Dr. Paulette Otis for her help in directing my research. Last of all I want to thank United States Marine Corps Sergeant Leonard Lee Wynn, my Grandfather, for always sharing his thoughts with me on what was right and educating me on the ways of the world.

Executive Summary

Title: AFRICOM Engineers: Using Water in the Fight for Regional Security

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Thesis: The mission for AFRICOM's newly formed organic engineering staff is not well defined. How can a staff that will be under sized, less than adequately funded, and geographically separated from the physical problems that it hopes to solve contribute to the overall security of Africa? Through a focused effort on water related problems, AFRICOM's joint engineering staff should take a lead role in stabilizing Africa. The engineers should pursue external resources through AFRICOM's unique structure by collaborating with various outside agencies.

Discussion: The newly formed combatant command, AFRICOM, has the enormous task of consolidating the responsibility of three other commands, building a staff, developing its mission, and preparing for their execution. Africa is a continent of growing social, economic, political, and geostrategic importance, but at the same time a continent of overwhelming poverty, rampant disease, chronic instability, and terrorist activity. Civil unrest exists in even the most stable of African countries; it is where international terrorist groups maintain havens and coexist with smugglers and other perpetrators of illicit activities. Africa is a geographic chessboard fielded with rival nations that are positioning for the control over important natural resources. Security in and out of Africa is important to the stability of our global community. AFRICOM's organic engineering staff will be under sized, less than adequately funded and geographically separated from the physical problems that affect the continent's security. This study proposes an overarching mission area for AFRICOM's joint engineering staff – water.

Conclusion: Inequity can contribute to an atmosphere ripe for conflict. It is the job of AFRICOM, through a new interagency method of soft war-fighting, to prevent these conflicts. The one thing that everyone human needs is water. With the help of interagency offices, NGOs, and private organizations, AFRICOM's engineering staff could be used to focus the efforts of those already working in Africa on water related issues. Creating a mission plan centered on water could help prevent conflicts from developing.

Chapter 1.

INTRODUCTION

The newly formed combatant command, AFRICOM, has the enormous task of consolidating the responsibility of three other commands, building a staff, developing its mission, and preparing for their execution.¹ Africa is a continent of growing social, economic, political, and geostrategic importance; but at the same time a continent of overwhelming poverty, rampant disease, chronic instability, and terrorist activity.² Africa is a continent where civil unrest exists in even the most stable of countries; it is where international terrorist groups maintain havens and coexist with smugglers and other perpetrators of illicit activities. Africa is becoming a geographic chessboard fielded with rival nations that are positioning for the control over important natural resources. Security in and out of Africa is important to the stability of our global community.

The vastness of AFRICOM's challenges in providing continental security to Africa will be limited in this paper to proposing an overarching mission area for the joint engineering staff. AFRICOM's organic engineering staff will be under sized, less than adequately funded, and geographically separated from the physical problems that it intends to solve. There is a possibility they could step outside the stereotypical support role and take part in creating a stable Africa through targeting water problems.

This study will examine how AFRICOM's joint engineering staff should take a lead role in helping stabilize Africa through a focused effort on water related problems. The study will begin with a discussion on why a focus on water is important in creating a stable African

¹ "AFRICOM FAQs." AFRICOM Home. <http://www.africom.mil/AboutAFRICOM.asp> (5 November 2007).

² Berschinski, Robert. "AFRICOM's Dilemma: The "Global War on Terrorism" "Capacity Building," Humanitarianism, and the Future of U.S. Security Policy in Africa." Strategic Studies Institute of the US Army War College. <http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=827> (22 November 2007), iii

environment and how this engineering mission ties into the United States' three main security strategies: The National Security Strategy, The National Defense Strategy, and the National Military Strategy. The study will then discuss how AFRICOMS's unique structure and softer war-fighting style should allow the joint engineering staff to collaborate with outside organizations like interagency offices, coalition partners, regional security organizations, international organizations, and Non- Governmental Offices (NGO) to resolve water related problems. The study concludes with a proposal of where these water related programs should be focused.

Chapter 2.

WHY WATER?

According to Abraham Maslow's Hierarchy of Needs, the most basic needs for humans are physiological in nature.³ Of those physiological needs, water is essential to sustain life. Water is not only important to the human body, but it is necessary in growing the crops and raising the livestock needed for human food consumption. Programs and projects designed to raise water quality, increase access to clean drinking water, boost crop irrigation, and enhance sanitary systems can spawn benefits in areas of health, education, democracy and governance, economic growth, and the environment.

Health - The quality of health in a country is directly tied to the availability of safe drinking water and related sanitation services. It is estimated that over 1.1 billion people lack access to safe drinking water in the world and that 2.6 billion people, almost half the total

³ Simons, Janet, Donald Irwin, and Beverly Drinnien. "MASLOW'S HIERARCHY OF NEEDS." Honolulu Community College. <http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/maslow.htm> (5 November 2007).

population of all developing countries, lack access to proper sanitation.⁴ Across the globe on any given day, approximately 50% of the world's hospital beds are filled with patients suffering from water and sanitation related diseases.⁵ Each year 1.8 million children in developing countries die from diarrheal related diseases. Diarrhea kills five times more children than HIV/AIDS.⁶ Groups of people who cannot raise their families or crops due to death and incapacitating illnesses from the basic need of water will turn to other means to survive. These other means can be migrating to urban areas, turning to illicit activities that produce better life standards, allowing insurgent groups to rule over them with the hope that they will provide what their government could not.

Education - Inadequate water supply and sanitation in schools create environments that negatively affect attendance. One United Nations study estimates that half the girls in Sub-Saharan Africa who drop out of primary school do so because of poor water and sanitation facilities.⁷ This is especially important when females reach puberty. This would seem to be an easy problem to fix with portable latrines and lyster bags. In many rural villages, those conveniences just do not exist. This is not just a matter of fairness; generations of uneducated females and the resulting inequalities are affecting Africa's future. The World Bank contends that if women in sub-Saharan Africa had equal access to education, land, credit and other assets, the region's gross national product could increase by almost one additional percentage point annually.⁸

⁴ McMurray, Claudia . "Africa's Water Crises and the U.S. Response." U.S. Department of State. www.state.gov/g/oes/rls/rm/2007/85333.htm (6 December 2007).

⁵ McMurray

⁶ McMurray

⁷ McMurray

⁸ Lafaniere, Sharon. "Special Report - Another School Barrier for Girls in Sub-Saharan Africa: No Toilet." Welcome to [wehaitians.com](http://www.wehaitians.com/another%20school%20barrier%20for%20girls%20in%20sub%20saharan%20africa%20no%20toilet.html). <http://www.wehaitians.com/another%20school%20barrier%20for%20girls%20in%20sub%20saharan%20africa%20no%20toilet.html> (14 February 2008).

Growing Governance - Providing any resource to those in need can build trust and cooperation. In that same regard water can be an important tool in building democracy and governance. Access to safe water is something that everyone wants. Members of a society want to be part of actions that affect their well-being; they will embrace participatory decision making associated with water. A spokes woman for the Under Secretary for Democracy and Global Affairs stated that they have reports of first time voters executing that right to elect a member of their local water board.⁹ Working to resolve water related problems also provides an opportunity to address a spectrum of governance and sustainable development challenges.¹⁰

Economy - The economic benefits of water may surpass that of the health impacts. The importance of water for economic development is well recognized. Increasing population, growing industrialization, and rising demands for water for other uses, is creating water related issues that are escalating at exponential rates in many African countries. Lack of water hampers development through constraining food production, health and industrial development.¹¹ Most agrarian-based economies are dependent on water. Economies and countries that lack the capacity to store and save water could face financial downfalls and possibly food insecurity. Famine can occur on the extreme end of the spectrum. In many African countries, there is a strong correlation between annual precipitation levels and the fluctuation in gross domestic product (GDP). Economies' based on regions where water is mismanaged can see their GDP affected by more than two percent. That small amount is high enough to keep a country in poverty.¹²

⁹ McMurray

¹⁰ McMurray

¹¹ Donkor, Stephen. "Water in Africa: Management Options to Enhance Survival and Growth." Economic Commission for Africa: UN support to NEPAD. <http://www.uneca.org/nepad/Docs/nepadwater.pdf> (5 December 2007), 2.

¹² McMurray

Environment - Water management is closely linked to the state of a region's economic conditions and environmental status. Poor management of waste water and fecal disposal can lead to contamination of water resources. Industrial activities like mining use large amounts of water, that if not properly treated, can lead to water and soil pollution, soil erosion, and degradation of ecosystems. Damage to ecological processes through water can cause irreparable damage to the environment and in return destroy the sustainability of an economy, let alone individual lives.¹³

Conflict - There have been many studies conducted that try to find the linkages between conflict and water. Potential sources of water driven conflict stem from access to adequate water supplies, livelihoods lost due to agricultural related droughts or property destruction due to floods, and the mismanagement of water resources.¹⁴ Figure 1 illustrates the complex inter-relatedness that water can have on a system and how water, as a natural resource (bottom left of figure), can be indirectly linked to conflict.¹⁵ Water can also indirectly influence or be influenced by other nodes such as

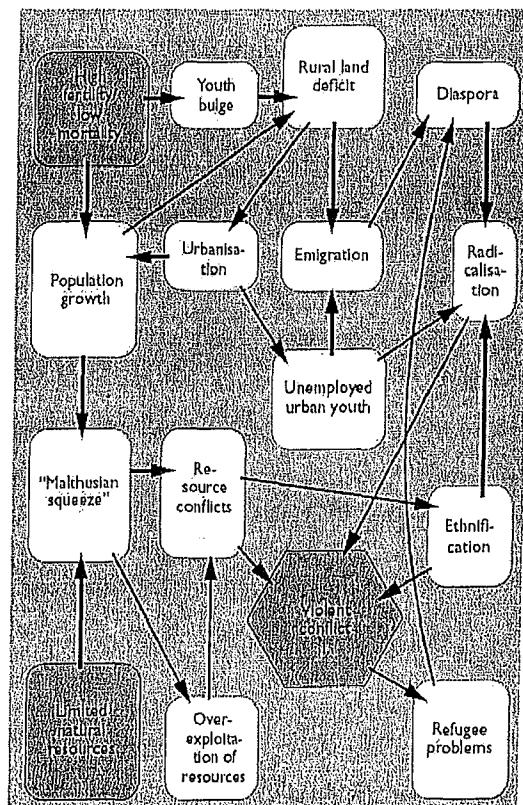


Figure 1 – Water and Conflict

¹³ Page, Edward, and Michael Redclift. *Human Security and the Environment: International Comparisons*. London: Edward Elgar Publishing, 2002, 229.

¹⁴ Carius, Alexander, Geoffrey Dabelko, and Aaron Wolf. "Water, Conflict, and Cooperation." Woodrow Wilson International Center: Environmental Change and Security Program. http://wilsoncenter.org/topics/pubs/ecspr10_unfcaribelko.pdf (7 January 2008), 61.

¹⁵ Møller, Bjørn. "The United Nations as a Security Political Actor - with a Special Focus on Africa - DIIS." Danish Institute for Internationals Studies. <http://www.diis.dk/sw17478.asp> (24 October 2007), 52.

population, urbanization, and rural land use. It has also been shown that these types of conflicts do not result in interstate problems, but intrastate instability.

Environmental scarcity – in interaction with other political, economic, and social factors – can generate conflict and instability, but the causal linkages are often indirect. Scarcities deepen poverty; generate large and destabilizing population movements; aggravate tensions along ethnic, racial, or religious lines; and debilitate political and social institutions.¹⁶

Figure 2 below provides a visual description of the relationship between water and the dynamics associated with population.¹⁷ With Africa's population growing at an exponential rate, the continent's ability to create the required infrastructure, water management policies and the knowledge base to deal with the increase supply and demand levels for clean water will be difficult. Figure 2 emphasizes the importance of water in Africa stability.

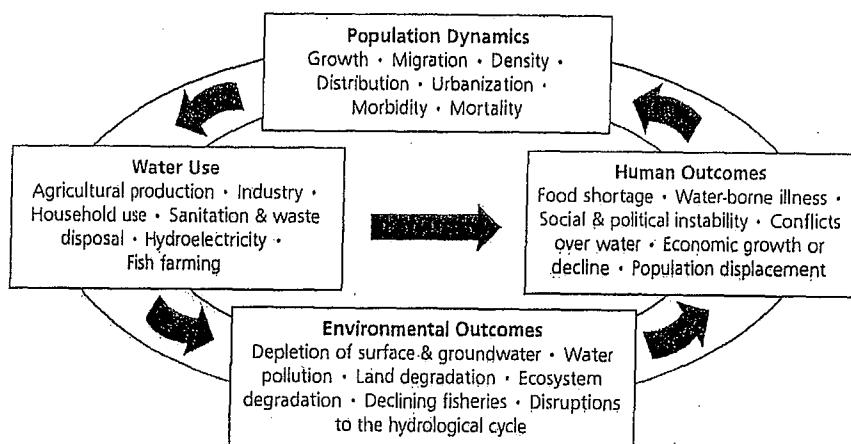


Figure 2 – Water Use, Population Dynamics, Human & Environmental Outcomes

After a conflict begins, water continues to have a link to military operations. Throughout history water has been a target of military action or as a result of military activities, has been degraded in some manner. Water supply infrastructure is always one of the first utilities targeted

¹⁶ Homer-Dixon, Thomas, and Valerie Percival. *Environmental Scarcity and Violent Conflict: Briefing Book*. New York: American Association for the Advancement of Science, 1996, 6.

¹⁷ Sherbinin, Alex De, and Victoria Dompka. *Water and Population Dynamics: Case Studies and Policy Implications (Report of a Workshop, October 1996, Montreal, Canada)*. Washington: American Assoc for the Advancement of Science, 1998, 11.

in war, and has in the last decade been a prime target for terrorist organizations. Shared water resources have also been used to pressure or threaten other governments as a strategic tool.¹⁸ In this regard, working on benevolent water related projects and programs to prevent or reduce conflicts can give the United States military and other national security related agencies an avenue for collecting data and intelligence on all aspects of a country. The following excerpt reinforces the idea that through water conflict may be reduced.

In contrast, little systematic research exists on an important corollary: that environmental cooperation may be a useful catalyst for broader processes of regional peacemaking. Water presents a ripe opportunity for proactively utilizing the transboundary and non-substitutable qualities of water as a cornerstone of confidence building and, potentially, peacemaking among states and groups within societies. In regions with unsettled interstate relations, shared water resources appear to present avenues for confidence building that can in turn support predictable and more enmeshed relations among potential adversaries.¹⁹

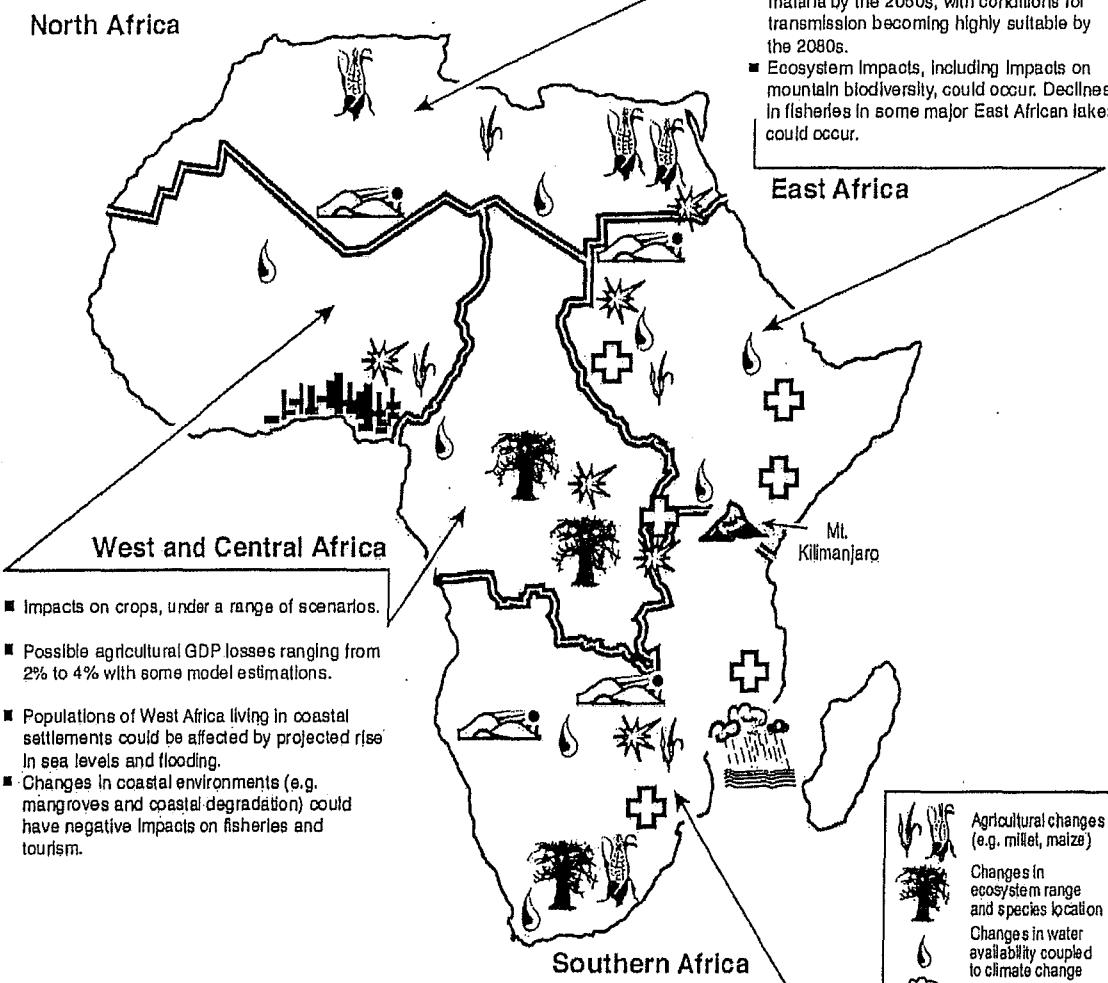
Figure 3 on the follow page provides an illustration of various water related problems as they currently exist in Africa. It also presents possible future impacts and vulnerabilities. No region within Africa is immune to the adverse consequences that water related problems can pose.

¹⁸ Diehl, Paul, and Nils Petter Gleditsch. *Environmental Conflict*. Oxford: Westview Press, 2000, 117-118.

¹⁹ Water Conflict and Cooperation: Looking over the Horizon ." Woodrow Wilson International Center for Scholars. http://www.wilsoncenter.org/index.cfm?fuseaction=news.print&news_id=22578&stoplayout=true (14 December 2007).

- Climate change could decrease mixed rain-fed and semi-arid systems, particularly the length of the growing period, e.g. on the margins of the Sahel.
- Some assessments show increased water stress and possible runoff decreases in parts of North Africa by 2050. While climate change should be considered in any future negotiations to share Nile water, the role of water basin management is also key.
- Rainfall is likely to increase in some parts of East Africa, according to some projections, resulting in various hydrological outcomes.

- Previously malaria-free highland areas in Ethiopia, Kenya, Rwanda and Burundi could experience modest changes to stable malaria by the 2050s, with conditions for transmission becoming highly suitable by the 2080s.
- Ecosystem Impacts, including Impacts on mountain biodiversity, could occur. Declines in fisheries in some major East African lakes could occur.



- Assessments of water availability, including water stress and water drainage, show that parts of southern Africa are highly vulnerable to climate variability and change. Possible heightened water stress in some river basins.
- Southward expansion of the transmission zone of malaria may likely occur.
- By 2099, dune fields may become highly dynamic, from northern South Africa to Angola and Zambia.
- Some biomes, for example the Fynbos and Succulent Karoo in southern Africa, are likely to be the most vulnerable ecosystems to projected climate changes, whilst the savanna is argued to be more resilient.
- Food security, already a humanitarian crisis in the region, is likely to be further aggravated by climate variability and change, aggravated by HIV/AIDS, poor governance and poor adaptation.

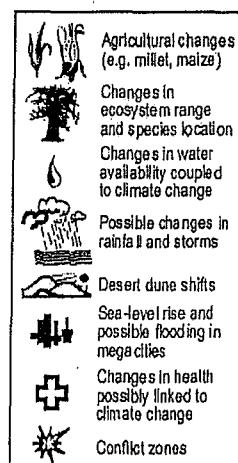


Figure 2 – Current and Potential Problems in Africa Associated with Water²⁰

²⁰ Githeko, Andrew, Mahmoud Medany, Balgis Osman-Elasha, Ramadjita Tabo, and Pius Yanda. "Working Group II Report "Impacts, Adaptation and Vulnerability"." Intergovernmental Panel on Climate Change. www.ipcc.ch/pdf/assessment-report/ar4/syr/ar4_syr.pdf (Mar. 19, 2008), 451.

Chapter 3.

THE CURRENT SITUATION

Though many are working to rectify African water problems, the situation is still particularly bleak. The excerpt below provides a quick summary of just some of Africa's problems that are tied to water.

In 27 African countries, greater than 30% of the population does not have access to safe water. In nine of those countries, more than 50% of the people lack access to safe water. There are 36 African countries where more than 50% of the population lacks access to sanitation. 40% of all child deaths from diarrhea are in Sub-Saharan Africa. Water and sanitation in schools is also critical problem, in some areas more than 150 children must share one latrine. While much of the world is on track to meet the MDGs on water and sanitation, most of Africa is not. Not only is progress slow, in some countries the proportion of people with access to safe water and sanitation is actually decreasing. To meet the MDGs in Sub-Saharan Africa, more than 23 million people a year will need to gain access to an improved water source; nearly 28 million per year to basic sanitation.²¹

The overall cost of the African water situation is just as frightening. There are many different estimates, but several reports suggest a cost of US\$20 billion annually for the next 25 years just for Africa. The problem is that most of the United States aid dollars that are tied to water will go to the Middle East where the current situation is perceived as more threatening. As the excerpt states below, funding will have to come from the global community to change the downward trajectory of Africa's water problems.

The scale of the water and sanitation problem in Africa is so great that it can only be met through the combined efforts of all actors. Funding will be needed from international donor agencies, multilateral development banks, private philanthropic organizations, private investors, and African governments. One recent estimate places the total annual expenditure requirement to meet the Millennium Development Goals for water and sanitation in Africa at \$6.7 billion.²²

Both naturally occurring and human made obstacles exist in the effort to correct water issues in Africa. Africa, though plagued with water problems, has large rivers, big lakes, and vast water lands. Africa suffers physically from its limited ground water resources. That is to

²¹ McMurray

²² "Senator Paul Simon Water for the Poor Act 2005 (P.L. 109-121) Report to Congress June 2007." U.S. Department of State - Home Page. <http://www.state.gov/g/oes/rls/rpts/85873.htm> (4 January 2008), Annex C, 75.

say that water that can be extracted from beneath the ground is difficult to find. The African water situation is plagued politically from its multiplicity of trans-boundary watersheds. Africa also suffers from extreme climate variability that produces floods and droughts every year. These floods impact the large rural and agricultural populations the most. To round out the list, the growing water scarcity is decreasing the size of certain water supplies and promoting desertification.

Overall governance is generally poor in most African countries and civil strife continually strains resources and slows progress. Even Kenya, considered to be one of the most stable democracies on the continent is currently in the midst of political and social unrest. Many African governments do not prioritize water related projects in national development plans and strategies.²³

The largest proportions of people who lack access to clean water are rural populations, but urbanization is increasing rapidly at a rate of nearly 9% per year.²⁴ This migration of people can be tied to depletion of water resources in the country through over use, pollution, and deforestation.²⁵ This change puts a heavy burden on the municipal services which are usually in need of repair and expansion.²⁶

Many of the industries in Africa, especially the mining industry, do not follow sound water management practices. The results of their misuse of water promote erosion and pollution.

²³ McMurray

²⁴ McMurray

²⁵ Busby, Joshua. "Climate Change and National Security - Council on Foreign Relations." Council on Foreign Relations. <http://www.cfr.org/publication/14862/> (15 December 2007), 9.

²⁶ Byrd, Miemie. "Combating Terrorism with Socioeconomics: Leveraging the Private Sector." *Joint Force Quarterly* 3rd Quarter (2007), 127-130.

The combination of these effects potentially destroys watersheds, ecosystems, and the potential for agricultural and pasture lands.²⁷

Africa's most serious socio-economic problems are that of poverty and massive underdevelopment, both of which have ties to water. The economic sector that has seen one of the worst growth rates over the past 30 plus years has been agriculture. This is a serious problem because agriculture is Africa's largest determinant of the continent's economic growth.

Agriculture on average consumes almost 88 percent of available freshwater resources.²⁸

The following passage summarizes the importance of agriculture to Africa's future stability and how water is directly related.

This interdependence between water availability and development is exemplified by the link between water and poverty. Due to poverty, access to adequate water and sanitation is low in Africa. Yet due to the inadequate access to safe water and sanitation, there is a high incidence of communicable diseases that reduce vitality and economic productivity on the continent. In effect, "half the work of a sick peasantry goes to feed the worms that make them sick". Inadequate access to water and sanitation is thus both a cause and a consequence of poverty. Similarly, inadequate water resources can become a constraint to improved agricultural development and food security. The net result would be reduced resource availability for water resources development, resulting in further reduction in the availability of water. It is noteworthy that, even with its current poor performance, agriculture is the largest user of water in Africa, accounting for about 85-88 percent of total water use. Yet only 185 million ha or 6 percent of the total area of the region is under cultivation. Of this, some 12 million or 6% of the total cultivated area is under irrigation. This is believed to be due, in part, to the very low levels of technology and efficiency in agricultural production. Thus there is considerable scope for improved agricultural production and food security through irrigation and rain-fed agriculture, which may or may not lead to increased demand for water.²⁹

This excerpt is a great verbal description of Figure 2. It shows how water's interwoven relationship to agriculture and human health can both be the cause and solution to the same problem, that of malnourished, sick, and impoverished people.

²⁷ Carius, Alexander, Geoffrey Dabelko, and Aaron Wolf. "Water, Conflict, and Cooperation." Woodrow Wilson International Center: Environmental Change and Security Program. http://wilsoncenter.org/topics/pubs/ecspr10_unfcaribelko.pdf (7 January 2008), 8.

²⁸ "African Water Development Report 2006." Economic Commission for Africa. http://www.uneca.org/sdd/African_Water_Regional_Report/water_dypt_report.htm (11 December 2007), 127.

²⁹ "African Water Vision 2025." United Nations Economic Commission for Africa. <http://www.uneca.org/awich/African%20Water%20Vision%202025.pdf> (21 November 2007), 6.

It is obvious that improvements to water related activities and management practices can create positive effects on countries, economies, and individuals. Beyond physical improvements to infrastructure deficiencies, like the development of irrigation and hydroelectric power projects, the proper management of water can also directly impact food and energy securities. Water is connected to so many of Africa's problems. It isn't the source of the issues, but improving its quality, quantity and management practices can have positive impacts on the following: health, education, democracy and governance, economic growth, the environment. Through an emphasis on one of our most basic needs, water, it may be possible to help reduce and prevent further violent conflicts on the continent of Africa.

Chapter 4.

AFRICAN WATER WOES AND UNITED STATES SECURITY

This chapter will discuss how the United States' National Security, National Defense, and National Military Strategies are related to the effects of water related problems in Africa. Water in Africa has ties to various security threats both on the continent and globally. World super powers like China and the United States have many national interests invested in the future of Africa. How threats to these interests are perceived and how the United States has previously postured to counter them will ultimately drive AFRICOM's engineering staff's mission.

This chapter begins with a review of our nation's security interests with the 2006 National Security Strategy of the United States of America. The following passage addresses the specific concerns with Africa:

Africa holds growing geo-strategic importance and is a high priority of this Administration. It is a place of promise and opportunity, linked to the United States by history, culture, commerce, and strategic significance. Our goal is an African continent that knows liberty, peace, stability, and increasing prosperity. Africa's potential has in the past been held hostage by the bitter legacy of colonial misrule and bad choices by some African leaders. The United States recognizes that our

security depends upon partnering with Africans to strengthen fragile and failing states and bring ungoverned areas under the control of effective democracies. Overcoming the challenges Africa faces requires partnership, not paternalism. Our strategy is to promote economic development and the expansion of effective, democratic governance so that African states can take the lead in addressing African challenges.³⁰

If you are to strengthen a fragile or failing state in order to create a healthy environment for democracies to grow, you first must make sure that the basic needs of the people to be governed are met. Without water and food to consume, a constituent will never develop faith in the ruling government. Engineering efforts related to water could be focused to meet our nation's security goals in Africa. These engineering programs must have no appearance of past colonial labors. For that reason, it is imperative that AFRICOM partner with countries, international organizations, and private groups beyond the United States.

The most current National Defense Strategy, dated March 2005, was written based on the previous National Security Strategy and does not specifically mention Africa. The excerpt below does state where and how the Secretary of Defense believed our national efforts should be focused to reduce threats to our nation's interests in the world.

The United States will counter aggression or coercion targeted at our partners and interests. Further, where dangerous political instability, aggression, or extremism threatens fundamental security interests, the United States will act with others to strengthen peace.³¹

The oldest of the three current strategic documents, the 2004 National Military Strategy, was developed based on the National Security Strategy from two times previously. It is very clear below, stating where in the world potential conflict is brewing, and how it poses a threat to our national interests.

There exists an "arc of instability" stretching from the Western Hemisphere, through Africa and the Middle East and extending to Asia. There are areas in this arc that serve as breeding grounds for threats to our interests. Within these areas rogue states provide sanctuary to terrorists, protecting them from surveillance and attack. Other adversaries take advantage of ungoverned

³⁰ Bush, George. "The National Security Strategy 2006." Welcome to the White House. <http://www.whitehouse.gov/nsc/nss/2006/> (6 December 2007), 37.

³¹ "2005 National Defense Strategy." US Department of Defense Resources. <http://www.defenselink.mil/news/Mar2005/d20050318nds1.pdf> (4 November 2007), 7.

space and under-governed territories from which they prepare plans, train forces and launch attacks. These ungoverned areas often coincide with locations of illicit activities; such coincidence creates opportunities for hostile coalitions of criminal elements and ideological extremists.³²

The 2004 National Military Strategy states as one of its supporting military objectives the prevention of conflict. Using AFRICOM's engineering staff, the new combatant command could begin its new mission by developing a plan of attack that meets the previously stated objective of conflict prevention through water related projects.

All three of the national strategies focus on making sure that stability exists in Africa. Now that AFRICOM has inherited that mission it must work to develop how they are going to protect our nation's interest in Africa. The next topic for discussion are the more specific water related issues that will affect Africa and guide AFRICOM's mission direction.

Senator Paul Simon's, *Water Act for the Poor*'s goal is to provide affordable and equitable access to safe water and sanitation in developing countries across the entire globe. The Act does not focus on any one geographical location, but all the water problems it prepares to address can be easily found in Africa. The Act's 2007 Report to Congress lists the following more specific water issues that have strategic importance to the United States:

- 1) The impact of climate variability and climate change on water affects key U.S. international policies to aid in sustainable development, promote stable and democratic governments, and protect public health.³³
- 2) The increasingly rapid growth of untreated municipal wastewater discharge into rivers, lakes, inland and coastal groundwater aquifers, and coastal waters around the world threatens the quality of the drinking water supply, public health, the environment and economic development. These impacts directly counteract U.S. efforts in developing countries to provide safe drinking water and other development assistance.³⁴
- 3) The health and well-being of coastal populations world-wide are intimately linked to the quality of the coastal marine environment. By 2020, developing countries will account for nearly 80 percent of total fish production, and almost 95 percent of the total number of fishermen. Therefore, protection of coastal areas from land-based pollution and from reduction of freshwater

³² "2004 National Military Strategy." US Department of Defense Resources.
<http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf> (8 November 2007), 5.

³³ Water for the Poor Act 2005 Report to Congress June 2007, 40.

³⁴ Water for the Poor Act 2005 Report to Congress June 2007, 42.

input into rivers and streams is critical to economic growth. In addition, the services provided by coastal ecosystems are especially vital for the welfare of the poor in developing countries.³⁵

4) For urban communities struggling with population increase, development needs, and political instability, inadequate or unevenly distributed water service can dangerously heighten social tensions, especially in post-conflict and transitional settings. Help is desperately needed for governments trying to maintain fragile peace in their refugee-burdened urban centers, like those in Liberia and South Sudan.³⁶

From the three strategies previously discussed and the excerpts from the “2007 Water for the Poor Act’s Report to Congress” one can see that there are reasons why the United States believes that it should be involved in Africa and how water ties to them. Scarcity of water and its effects on food production alone can create situations ripe for disaster.

What is not clear so far is how water and instability are tied to United States security and the use of military forces on the ground in Africa. The following key findings from the *Environmental Scarcity and Violent Conflict: Briefing Book* provide that link between water, security, the United States interest in Africa and AFRICOM’s new mission.³⁷

If social and economic adaptation is unsuccessful at countering renewable resource scarcities, then environmental scarcity will continue to contribute to impoverishment and migrations of populations

In the absence of adaptation, environmental scarcity weakens states, sharpens distinctions among groups, enhances their opportunities to participate in violent collective actions, and contributes to economic decline, which in turn can cause ethnic conflicts, insurgencies, and coups d’etat.

Conflicts generated in part by environmental scarcity can have significant indirect effects on the international community

Besides the United States interests in African oil reserves, mineral resources, and stability for the sake of economic growth, our main interest according to documented strategy and current literature should be on preventing states from failing or areas from becoming ungoverned. These unencumbered locations provide terrorist organizations like Al-Qaida a place to organize, build,

³⁵ Water for the Poor Act 2005 Report to Congress June 2007, 44.

³⁶ Water for the Poor Act 2005 Report to Congress June 2007, 6.

³⁷ Homer-Dixon, 2-9.

and train. The following passage provides an excellent definition of a failed state and why it is imperative that the United States tries to prevent their creations.

Failed states—states in which government authority has collapsed, violence has become endemic, and functional governance has ceased—have emerged in the period since the end of the Cold War as one of the most difficult challenges confronting the international community, especially in the region of Sub-Saharan Africa. Transnational terrorist groups use the chaos of failed states to shield themselves from effective counterterrorism efforts by the international community. The potential nexus of failed state-based terrorism and terrorists' access to Weapons of Mass Destruction (WMD), especially nuclear WMD, escalates the risk that such groups pose to the United States and to its allies in the Global War on Terror.³⁸

It is a long and winding journey from not having enough water, to the creation of a failed state that is the breeding ground for terrorists, but it's a trail that has been traversed in Africa. The linkages between water related problems in Africa and United States security are real. The information provided in Figures 1 and 2, the previously discussed findings on water scarcity, and our nation's top three security related strategies come together to illustrates this point. It can also be said that it is much harder to rebuild a failed state and have to defeat the insurgents that become imbedded in that society than it is to prevent the conflicts that create those environments in the first place. The United States does not have a military large enough, or available at the moment, to take on this enormous task. The United States does not have the fiscal resources to fund such an endeavor, nor is it a current priority.

One way to prevent these conflicts without the use of large military forces or spending additional United States government dollars is through international and non-governmental organization projects that focus on fixing water related problems in Africa. There are so many organizations with vast engineering capabilities and knowledge that are already working on fixing water problems in Africa. The next step is to organize and focus enough of these organizations so the military will not have to commit to troops on the ground in more locations

³⁸ Dempsey, Thomas. "Counterterrorism in African Failed States: Challenges and Potential Solutions." Strategic Studies Institute of the US Army War College.

on the African continent. The next chapter will discuss how AFRICOM's unique structure should allow for a more robust approach to providing solutions to national security interests with a smaller military presence by working with outside organizations.

Chapter 5.

THE UNIQUE DESIGN OF AFRICOM'S STAFF

AFRICOM's mantra is that it is pioneering a bold new method of military engagement focused on war prevention, interagency cooperation, and development rather than on traditional warfighting. It is as if they are trying to incorporate the Diplomatic, Information, Military, and Economic (DIME) model into one organization. The design behind AFRICOM's new structure is an important step in improving interagency coordination. It will attempt to bridge the divide between the Department of Defense and multitude of other U.S. Government agencies.

AFRICOM has established that it exists to prevent conflicts through security cooperation, civil-military initiatives, and humanitarian projects.³⁹ AFRICOM's interagency structure is designed to be a more effective means of achieving a collaborative and coherent U.S. policy toward Africa. The key piece to all of this is that they promote nonkinetics approaches to counterinsurgencies and other armed dilemmas.⁴⁰

The United States Department of Defense Directive 3000.05, dated 28 November 2005, provides clear guidance on how military support for Stability, Security, Transition, and Reconstruction (SSTR) operations should be conducted. These types of operations, water related projects being a subset, fit neatly into the role of prevention and should be adapted for AFRICOM's unique structure.

<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=649> (29 November 2007), iii.

³⁹ Berschinski, iii,7.

The following excerpt highlights this point.

4.4. Integrated civilian and military efforts are key to successful stability operations. Whether conducting or supporting stability operations, the Department of Defense shall be prepared to work closely with relevant U.S. Departments and Agencies, foreign governments and security forces, global and regional international organizations, U.S. and foreign nongovernmental organizations, and private sector individuals and for-profit companies.⁴¹

Joint Publications 3-08, Interagency, Intergovernmental Organization, and Nongovernmental Organization Coordination During Joint Operations, along with Joint Publication 3-57, Joint Doctrine for Civil-Military Operations, also emphasize how important the ties between the military and other agencies, both governmental and private, is to meeting the goals of all United States security strategies.^{42,43}

Interagency cooperation is extremely important to the success of AFRICOM's proposed mission process. Without agencies like U.S. Agency for International Development (USAID) and U.S. Army Corps of Engineers (USACE) directly tied into AFRICOM's engineering staff, developing water related projects in Africa in coordination with NGOs and the United Nations will be almost impossible for a small military staff. To make this new process work though, the structure of the headquarters staff needs to be such that it allows for engineers to work continuously with interagency officials. These interagency officials have to have direct links to the African people and the international and nongovernmental agencies that support them.

The current proposed structure of the engineering staff for AFRICOM is eight people, four military and four Department of Defense civilians. None of the civilians are from

⁴⁰ Berschinski, iii, 1.

⁴¹ "Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations." Defense Department Intelligence and Security Doctrine, Directives and Instructions. http://www.fas.org/irp/doddir/dod/d3000_05.pdf (23 November 2007), 3.

⁴² "Interagency, Intergovernmental Organization, and Nongovernmental Organization Coordination during Joint Operations, Volumes I & II." National Defense University: Interagency Transformation, Education and Analysis Program. <http://www.ndu.edu/itea/index.cfm?method=main.itemlist&item=78&resource=1> (6 December 2007).

⁴³ "Joint Publication 3-57: Joint Doctrine for Civil-Military Operations." Defense Technical Information Center: Joint Electronic Library. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_57.pdf (6 December 2007).

interagency offices. The following is the functional description of AFRICOM's engineering division.

This function provides the oversight and guidance for all facilities and contingency engineering programs, including military construction; family and bachelor housing; facilities sustainment, restoration and modernization; environmental; program oversight of military engineering programs and requirements; contingency engineering planning in support of OPLANS/CONPLANS/FUNCPLANS, humanitarian assistance projects, exercise related construction (ERC); and coordinating military engineer participation during exercises and contingency operations.⁴⁴

According to this description, these engineers are focusing only on the needs of the military with one exception. The only area where proposed water related projects could possibly fit into this description is under humanitarian assistance projects. There does not seem to be a prevention role for military engineers to focus on under this staff structure. There are not any interagency personnel directly tied to their office.

The one branch that seems to meet the criteria for using water as a tool to prevent conflict in AFRICOM's staff is the Humanitarian Assistance Branch. This branch's job is to assess host countries and determine the humanitarian assistance requirements on a meager \$18 million budget. The staff has nine individuals, two of which are dedicated to HIV/AIDS; it does not have any engineers.

The current structure of the AFRICOM staff doesn't lend itself to a proposed use of engineers working hand in hand with interagency offices to prevent conflict through water related endeavors. The major problem is building an organization that would integrate interagency personnel. The vast majority of the other U.S. governmental agencies are stressed for manpower and funding and cannot fill the needed positions on the AFRICOM staff. Annex A of the Water for the Poor Act Report to Congress, dated July 2007, contains a listing of the twenty two U.S. agencies that have missions and capabilities associated with water. Agencies

⁴⁴ "Briefing Slides" AFRICOM. Joint Manpower Validation Board (October 27, 2007), Power Point Presentation,

like the Peace Corps and the National Oceanic and Atmospheric Administration, just to name two, could add significant abilities to the AFRICOM staff. Their added manpower, resources, and knowledge would create a synergistic affect on this new combatant command.⁴⁵

Beyond governmental agencies and our coalition partners are international, non-governmental, and private organizations. These groups in conjunction with the military and government agencies of various countries create a much deeper pool of resources. The quantity of these organizations that work on water related project and programs within Africa is outside the scope of this paper, but their numbers, knowledge base and monetary resources far exceed that of any consortium of governmental agencies the U.S. government can organize. They also offer another medium for collecting vital information and intelligence on a region. These organizations have the means to work through the entire spectrum of conflict, from prevention to resolution. Many of these organizations are tied to and or tracked through the United Nations. The complexity of these organizations, their relationship to other countries, and their involvement in international agendas requires the involvement of the United States Department of State.⁴⁶

The NGOs of the world and our interagency offices are an untidy mess of overlapping and sometimes misdirected agendas. This in itself poses a problem. These agencies, all going different directions, could actually hamper AFRICOM's quest to use water as a means to prevent conflict and bolster U.S. security interests in Africa. There needs to be a clearing house that organizes and focuses the efforts of all these organizations to benefit Africa and U.S. interests. I do not believe that the current structure of AFRICOM creates this clearing house. AFRICOM's

slide 169

⁴⁵ Water for the Poor Act 2005 Report to Congress June 2007, Annex A.

⁴⁶ Water for the Poor Act 2005 Report to Congress June 2007

commitment to its new method of cooperative partnerships does however create an environment conducive to growing these relationships.

Chapter 6.

WHERE TO BEGIN

If working on water related programs and projects is a good place for a limited engineering staff to start working to help stabilize and prevent conflicts in Africa; and the structure of AFRICOM is developed so these engineers have access to the various interagency experts and NGOs, where do they start? Africa is an enormous place. Starting in one area and not another may in itself create more conflict. This section will present some areas within the realm of water and ideas that may answer the question of where to start.

According to J.A. Allan, a professor of geography at the University of London, there are two types of water, "small" and "big". The following passage from one of his studies expands upon this idea.

Small water is the water needed for drinking, domestic uses and the water needed by industry and services. The small water is about 10 per cent of the water needed by an individual as well as the 10 per cent of water needed for the security of an economy as a whole. This small water must come from freshwater sources – rivers, lakes, reservoirs and groundwater. Small water can command quite high prices and is commonly delivered for about US\$1 per cubic metre. The big water is the 90 per cent of water needed by an individual and economy to be self-sufficient in food. The water to raise food can come from freshwater sources in which case it competes with the provision of water for domestic and industrial livelihood uses as well as for the security of environmental services. The water to raise food can also come from the soil profile. Soil water, or effective rainfall, is the majority water in economies located in humid temperate and humid tropical regions. Semi-arid regions have to endure their very poor endowment in soil water. The huge volumes of big water are expected to be free if available in a soil profile. Much more worryingly, they are expected to be nearly free when delivered by a costly irrigation system from surface or groundwater sources.⁴⁷

⁴⁷ Allan, John. "Water in the Environment/Socio-Economic Development Discourse: Sustainability, Changing Management Paradigms and Policy Responses in a Global System." *Government and Opposition* Spring (2005), 187.

Based on the definition of small and big water and from effects poor water resource can have from Chapter 2, I propose that two simultaneous approaches need to occur. Health and agriculture related project and programs will have the greatest affect on the lives and economic growth of most Africans.

The first topic that should be attacked is that of health. It is inconceivable to immediately try to make sure everyone one in Africa has access to clean running water. What can be done is to provide clean water, sanitary conditions, and education about the two at schools. The reduction of exposure to contaminated water and the reinforcement of health and hygiene practices will promote increased school attendance in school age children, while at the same time decrease diseases. Teaching the children will have an impact on their wider community as well. Using interagencies and groups like UNICEF in a program like this would only increase in success rate.

The next area of importance is agriculture. This is an extremely broad area, but the focus would be on crop irrigation and water management. In areas where the "big water" is scarce, teaching water management practices are essential. Not only do the farmers need education on how to properly irrigate crops, but jobs should be created to maintain these newly acquired agriculture implementation machines and processes. There have been several instances where NGOs have gone in and installed well pumps and other water providing equipment that eventually break and there is no one to fix or replace the devices. Education is the key to increasing the agricultural productivity of the African continent.

A major problem in Africa is that food production is not keeping up with the exponential population growth. With the disproportion of supply and demand in the

agricultural industry comes the shortage of food. A multitude of other issues perpetuate from this problem. A serious issue in Africa that has ties to the decline in food production, scarce water supplies, and overall poverty is urbanization. Individuals from poorer rural areas that would be farmers, that have stopped farming due to lack of water, funds, or are in search of a better life, are migrating to urban areas. This influx of people on urban water systems is taking its toll. Many of the areas have water and sanitary systems that are outdated, in need of repair, and vastly undersized. People that move to the urban areas find that their plight in life is not any better than it was; they live in shanty towns that have little to any utilities.

One method that is gaining ground for predicting where new areas of conflict will develop is through the analysis of demographic trends. Studying the "who, what, when, where, and why" associated with changes in a region's population can be lead to recognizing warning signs of what is to come. Studying the environmental changes due to demographic trends could highlight areas where water related programs could be focused to help head off future conflicts.

One means of gathering the data to analyze these demographic changes is to incorporate other organizations like NGOs into the process. There is information that these non-military organizations collect as part of their work that the military and other government agencies either can't or just don't have the means to gather. There are so many agencies, public, private, and governmental, that are currently working in Africa to fix a plethora of problems whose data is currently untapped.

The United States Army Corps of Engineers has the ability to create a database and analyze this type of information and place it on the internet. The classification of

such a database would depend on the information being gathered and to what purpose. A tool like this, if shared with other agencies accomplishing water related works, could help AFRICOM focus the efforts of many other organizations in a systematic manner to achieve a synergistic affect.

Chapter 7.

CONCLUSIONS

Stabilization of Africa is a goal of the United States' current national security priorities. This paper proposes a strategy that combats African instability by solving water related problems with the employment of the various governmental and non-governmental agencies through AFRICOM's joint engineering staff. Solving these water problems will greatly decrease a host of negative factors that have the potential to create more conflict in an already destabilized U.S. interest. A mission plan that centers on water related problems could also help prevent future conflicts from developing.

AFRICOM's joint engineering staff is comprised of eight people with a small budget. Though a seemingly impossible task, instead of focusing this limited engineering staff on the status quo mission of facility support, it should be used to help execute new DOD SSTR operations centered on water. Leveraging the help of interagency offices, NGOs, and private organizations, AFRICOM's engineering staff could focus the efforts of those already working in Africa on water related issues. These outside agencies should be managed in a manner that focuses their engineering and educational resources on improving water related problems that decrease flooding, draught, and increase access to clean water. These outside organizations have

access to funds, manpower, and knowledge pools that far surpass what the military alone could organize. Their efforts just need to be aligned to an overall agenda and de-conflicted.

The main focus of this networked water force should be on “big water” and the agriculture economic base. Not only should projects be funded to correct deficiencies within the realm of “big water”, but jobs should be created to maintain what is developed and the education curriculum established to perpetuate additional improvements. Along with water projects that center on the production of food, improving health and the reduction of waterborne diseases through clean water is paramount.

Prior to deploying troops and organizations to start teaching watershed management, building levees, or training villages on water purification techniques, large amounts of data need to be collected. Data is needed on Africa’s wide spread population relocation to urban areas. To keep up with the growing demand for food, and counter harmful population migrations, the infrastructure and water management practices as they relate to agriculture need to be improved. Medical data for the use in tracking and developing surveillance of waterborne disease outbreaks will also help narrow the areas from where to begin. Mapping of demographics and population movements could guide planners around possible pitfalls and avoid creating new problems.

In conclusion, this proposed security strategy is based on not only resolving water related problems with engineers at AFRICOM, but creating an environment were Africans can also help in stabilizing their continent. Stability, a subjective term, is only as good as the indigenous population’s capacity to sustain it. This strategy could be viewed as successful if all the countries within Africa are able to take the tools and information provided and begin making positive changes on their own. Reaching the point where positive change occurs will only be possible through true integration of governmental and non-governmental agencies.

Appendix.

**EXAMPLE HUMAN SECURITY ASSISTANCE STRATEGY:
COMBATING WATERBORNE DISEASES IN THE HORN OF AFRICA**

The United States recognizes that its security depends upon partnering with Africans to strengthen fragile and failing states and bring ungoverned areas under the control of more effective democracies. The United States' goal is an African continent that knows liberty, peace, stability, and increasing prosperity.⁴⁸ All of the countries within the Horn of Africa (HOA) are either failing as a state or are fragile ineffective democracies that contain vast ungoverned spaces. The United States has troops deployed in the HOA not only to execute the global war on terrorism, but to help stabilize this region. Creating a security assistance strategy for the entire African continent would be a daunting task. For this reason, a more precise human security strategy is needed to create an immediate and lasting effect on the region.

One grouping of non-state security threats that indiscriminately affect all inhabitants of the region are waterborne diseases and their epidemiologically related vectors. These diseases mainly kill their victims through excessive diarrhea and many are communicable. Waterborne diseases include typhoid, cholera, hepatitis, giardiasis, and a handful more. There are several vector borne diseases that are directly linked to water as well. Mosquitoes, which depend on water for their life cycle, carry diseases that are just as deadly. Tackling the issue of waterborne diseases provides the most “bang for the buck” for the HOA region.

To say that the inhabitants of the Horn of Africa region are getting sick due to unclean water and poor sanitation conditions alone is an overall simplification. Though this is true, it isn't the root cause of the matter; the problem is that there is no single root cause.

⁴⁸ George Bush, 37.

The following list provides a detailed account of the issues that are robbing the HOA inhabitants of their coping mechanisms and leading to a greater vulnerability to waterborne diseases.⁴⁹

- The Horn of Africa region is facing heavy crisis with cumulative erosion of assets for both pastoral and agricultural communities
- Conflict in Somalia has increased population displacement: there is an influx of refugees in Kenya & Ethiopia
- Vulnerable affected people are at risk of malnutrition and communicable diseases (living conditions of displace population)
- Affected areas are experiencing heavy rainfall which deepens the humanitarian and livelihoods crisis of the communities (health related problems: water borne diseases)
- Drought affected countries experiencing outbreaks
- Issue of cross border diseases
- Poor health system
 - Working environment in these areas is harsh, difficult to maintain health workers
 - Lack of health infrastructure
 - Limited access to primary health care services
 - Low immunization coverage
 - Lack of emergency obstetric care/child & mother preventive care
- Poor education system: health and sanitation practices not adequately taught
- Migration of poor to urban area where infrastructure is lacking

Many elements of the climate, geography, economy, educational system, and human demography within the Horn of Africa are affecting the disease potential of humans through their contact with water. Therefore managing water can directly improve the quality of health in the HOA, which will have cascading effects on economic productivity and overall human security.

⁴⁹ Yao, Michel. "Health and Epidemics in the Horn of Africa Region." World Health Organization. http://www.who.int/entity/hac/crises/international/hoafrica/sitreps/HoA_Health_and_Epidemics_22_24Nov2006 (accessed Mar. 6, 2008), slides 3-6.

Controlling flood waters, limiting drought through irrigation, providing access to clean water, educating the HOA populace on sanitation, and creating jobs within these areas are each as important as the other in building a long-term human security strategy in the region. One enormous indirect effect of attacking waterborne diseases will be alleviating the overwhelmed and insufficient health care system.

Three main areas will be addressed in laying out the security assistance strategy to combat waterborne diseases in the Horn of Africa. These areas are (1) Too Much Water, (2) Too Little Water, and (3) Clean Water.

Too Much Water – Flooding in the HOA affects the environment through stagnating water, breeding grounds of mosquitoes, and dilutes the quantity of clean water. Flooding displaces people, who in turn overwhelm the health care and essential services infrastructure systems.⁵⁰ Flooding destroys crops, personal property, and blocks access to food. The United States alone has tremendous knowledge on how to deal with flooding. The U.S. Army Corps of Engineers and nongovernmental organizations (NGO) like *Engineers Without Borders*, have the manpower, economic wealth, and education levels needed to begin managing flooding in the HOA. The Army Corps of Engineers' Topographic Engineering Center Water Resource Division manages a robust hydrological database that could be used to analyze this type of information to further expedite the reduction of HOA flooding.

Too Little Water – The major cause for the lack of water is drought. Another reason is the hydrological characteristics of African ground water. Outside of rivers and lakes, there isn't an abundance of water beneath the soil that the typical HOA resident can reach. Water shortages increase the vulnerability for communicable diseases to exist and spread while decreasing the

⁵⁰ Yao, slide 12.

quantities of livestock and successful agricultural crops.⁵¹ The same organizations listed in the prior paragraph, along with a host of U.S. military engineering elements have the capabilities to drill wells, treat water, and build capacity retaining facilities. Besides water to drink, cook, and clean with, water is needed for the irrigation of crops. The knowledge for building effective irrigation practices is held in our vast higher education system and in NGOs associated with our nation's agricultural industry.

Clean Water –There are three major aspects to creating a sustainable supply of clean water. The first, and most important aspect, is education. Beginning with educating school age children and following with the rest of society in proper sanitation practices can prevent the occurrence and spread of waterborne diseases. Education can be relatively inexpensive to accomplish. The U.S. Agency for International Development already has several water and sanitation based educational programs started within the African continent. Second is having the ability to treat both potable and waste waters. This can be as simple as boiling water or as complex as a municipal water treatment facility. The last aspect of importance is controlling pollutants that can enter a water supply. Pollutants can be from industrial processing like mining or from poor use of agricultural fertilizers and pesticides. Pollutants don't necessarily introduce waterborne diseases, but they can reduce the available quantities of useful water or make treating water much more expensive and labor intensive. As with flooding and draught, the United States is quite capable of educating and training other nations in producing clean water and managing environmental pollutants.

The desired end state of this strategy is to decrease levels of waterborne diseases, education the populous so they can maintain and improve upon U.S. actions, and further stabilize the Horn of Africa.

⁵¹ Yao, slide 10.

Bibliography

"2004 National Military Strategy." US Department of Defense Resources.
<http://www.defenselink.mil/news/Mar2005/d20050318nms.pdf>
(8 November 2007).

"2005 National Defense Strategy." US Department of Defense Resources.
<http://www.defenselink.mil/news/Mar2005/d20050318nds1.pdf>
(4 November 2007).

"AFRICOM FAQs." AFRICOM Home. <http://www.africom.mil/AboutAFRICOM.asp> (5 Novermber 2007).

"Africa's Sustainable Development Bulletin 2006." United Nations Economic Commission for Africa (UNECA). http://www.uneca.org/eca_programmes/sdd/default.htm (4 January 2007).

"African Water Development Report 2006." Economic Commission for Africa.
http://www.uneca.org/sdd/African_Water_Regional_Report/water_dvpt_report.htm (11 December 2007).

"African Water Vision 2025." United Nations Economic Commission for Africa.
<http://www.uneca.org/awich/African%20Water%20Vision%202025.pdf> (21 November 2007).

Allan, John. "Water in the Environment/Socio-Economic Development Discourse: Sustainability, Changing Management Paradigms and Policy Responses in a Global System." *Government and Opposition* Spring (2005): 181-199.

Barrios, Salvador, Luisito Bertinelli, and Eric Strobl. "Rainfall and Africa's Growth Tragedy." The University of Dublin: Institute for International Integration Studies.
<http://www.tcd.ie/iiis/pages/events/seminars0405.php> (18 December 2007).

Benneh, George, William Morgan, and Juha Uitto. *Sustaining the Future: Economic, Social and Environmental Change in Sub-Saharan Africa*. New York: United Nations University Press, 1996.

Berschinski, Robert. "AFRICOM's Dilemma: The "Global War on Terrorism," "Capacity Building," Humanitarianism, and the Future of U.S. Security Policy in Africa." Strategic Studies Institute of the US Army War College.
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=827> (22 November 2007).

Bradshaw, Arthur. "International Environmental Security: The Regional Dimension." Public STINET (Scientific and Technical Information Network).
<http://stinet.dtic.mil/oai/oai?verb=getRecord&metadataPrefix=html&identifier=ADA423861> (24 October 2007).

Brainard, Lael. *Security by Other Means: Foreign Assistance, Global Poverty, and American Leadership*. Washington, D.C.: Brookings Institution Press, 2007.

"Briefing Slides" AFRICOM. Joint Manpower Validation Board (October 27, 2007), Power Point Presentation.

Busby, Joshua. "Climate Change and National Security - Council on Foreign Relations." Council on Foreign Relations. <http://www.cfr.org/publication/14862/> (15 December 2007).

Bush, George. "The National Security Strategy 2006." Welcome to the White House.
<http://www.whitehouse.gov/nsc/nss/2006/> (6 December 2007).

Butts, Kent, and Arthur Bradshaw. "Military Education Workshop Addresses Threats to Stability and Security." US Army War College: Issue Paper Publications - Center for Strategic Leadership (CSL). <http://www.carlisle.army.mil/usacsl/publications/IP%208-07%20-%20Military%20Education%20Workshop.pdf> (12 October 2007).

Butts, Kent. "Environmental Security: A DoD Partnership for Peace." Strategic Studies Institute of the US Army War College.
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=339> (11 December 2007).

Byrd, Miemie. "Combating Terrorism with Socioeconomics: Leveraging the Private Sector." *Joint Force Quarterly* 3rd Quarter (2007): 127-130.

Cale, Paul. "African Command - The Newest Combatant Command." Strategic Studies Institute of the US Army War College. <http://www.strategicstudiesinstitute.army.mil/> (10 December 2007).

Cantwell, Gregory. "Nation-Building: A Joint Enterprise." *Parameters* XXXVII (2007): 54-67.

Carius, Alexander, Geoffrey Dabelko, and Aaron Wolf. "Water, Conflict, and Cooperation." Woodrow Wilson International Center: Environmental Change and Security Program.
http://wilsoncenter.org/topics/pubs/ecspr10_unf-caribelko.pdf (7 January 2008).

Carment, David, and Albrecht Schnabel. *Conflict Prevention: Path to Peace or Grand Illusion? (Foundation of Peace (Series Title).)*. NEW YORK: United Nations Publications, 2003.

Chau, Donovan. "Political Warfare in Sub-Saharan Africa: U.S. Capabilities and Chinese Operations in Ethiopia, Kenya, Nigeria, and South Africa." Strategic Studies Institute of the US Army War College.
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?PubID=766> (29 November 2007).

Church, Cheyanne, and Mari Fitzduff. *NGOs at the Table: Strategies for Influencing Policy in Areas of Conflict*. Lanham: Rowman & Littlefield Publishers, Inc., 2004.

Dempsey, Thomas. "Counterterrorism in African Failed States: Challenges and Potential Solutions." Strategic Studies Institute of the US Army War College.
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=649> (29 November 2007).

Diehl, Paul, and Nils Petter Gleditsch. *Environmental Conflict*. Oxford: Westview Press, 2000.

"Directing the Flow: a new approach to integrated water resources management." EU Water Initiative - Publications. http://ec.europa.eu/research/water-initiative/pdf/iwrm_060217_en.pdf (3 January 2008).

Donkor, Stephen. "Water in Africa: Management Options to Enhance Survival and Growth." Economic Commission for Africa: UN support to NEPAD.
<http://www.uneca.org/nepad/Docs/nepadwater.pdf> (5 December 2007).

Dovi, Efam. "Bringing Water to Africa's Poor." *Africa Renewal* 21 (2007): 7-9,22.

"Environmental Change and Security Program Report 12." Woodrow Wilson International Center for Scholars. http://wilsoncenter.org/topics/pubs/ECSP_report_12.pdf (14 December 2007).

Fox, C. William. "Military Medical Operations in Sub-Saharan Africa." Strategic Studies Institute of the US Army War College.
<http://www.strategicstudiesinstitute.army.mil/pubs/display.cfm?pubID=202> (29 November 2007).

Gerstenfeld, Arthur , and Raphael Njoroge. "Project-based learning in developing countries." WPI ASEE Conference News. <http://www.wpi.edu/News/Conf/ASEE/PDFs/2-g-gerstenfeld.pdf> (18 December 2007).

"Global Water Supply and Sanitation Assessment 2000 Report." World Health Organization: Water Sanitation and Health.
http://www.who.int/water_sanitation_health/monitoring/globalassess/en/ (3 January 2008).

Green, Brian. "A Human Ecological Analysis of the Causes of Conflict and Cooperation Between Nations Over Freshwater Resources." OhioLINK - The Ohio Library and Information Network. <http://www.ohiolink.edu/etd/send-pdf.cgi?osu1039201377> (18 December 2007).

Homer-Dixon, Thomas, and Valerie Percival. *Environmental Scarcity and Violent Conflict: Briefing Book*. New York: American Association for the Advancement of Science, 1996.

"Integrated Water Resources Development and Management within the Southern African Development Community ." Defense Technical Information Center (DTIC) . <http://stinet.dtic.mil/oai/oai?&verb=getRecord&metadataPrefix=html&identifier=ADA456570> (24 October 2007).

"Interagency, Intergovernmental Organization, and Nongovernmental Organization Coordination during Joint Operations, Volumes I & II." National Defense University: Interagency Transformation, Education and Analysis Program. <http://www.ndu.edu/itea/index.cfm?method=main.itemlist&item=78&resource=1> (6 December 2007).

"Joint Publication 3-34: Joint Engineer Operations." Defense Technical Information Center: Joint Electronic Library. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_34.pdf (23 August 2007).

"Joint Publication 3-57: Joint Doctrine for Civil-Military Operations." Defense Technical Information Center: Joint Electronic Library. http://www.dtic.mil/doctrine/jel/new_pubs/jp3_57.pdf (6 December 2007).

Lafraniere, Sharon. "Special Report - Another School Barrier for Girls in Sub-Saharan Africa: No Toilet." Welcome to [wehaitians.com](http://www.wehaitians.com/another%20school%20barrier%20for%20girls%20in%20sub%20saharan%20africa%20no%20toilet.html). <http://www.wehaitians.com/another%20school%20barrier%20for%20girls%20in%20sub%20saharan%20africa%20no%20toilet.html> (14 February 2008).

Levy, Marc , Catherine Thorkelson, Charles Vörösmarty, Ellen Douglas, and Macartan Humphreys. "Freshwater Availability Anomalies and Outbreak of Internal War." Center for International Earth Science Information Network. <http://www.ciesin.org/pdf/waterconflict.pdf> (18 December 2007).

Lowi, Miriam, and Brian Shaw. *Environment and Security: Discourses and Practices (International Political Economy)*. New York: Palgrave Macmillan, 2000.

McMurray, Claudia. "Africa's Water Crises and the U.S. Response." U.S. Department of State. <http://www.state.gov/g/oes/rls/rm/2007/85333.htm> (6 December 2007).

"Military Support for Stability, Security, Transition, and Reconstruction (SSTR) Operations." Defense Department Intelligence and Security Doctrine, Directives and Instructions. http://www.fas.org/irp/doddir/dod/d3000_05.pdf (23 November 2007).

"More Than Humanitarianism - A Strategic U.S. Approach Toward Africa." Council on Foreign Relations. http://www.cfr.org/publication/9302/more_than_humanitarianism.html?breadcrumb=%2Fpublication%2Fby_type%2Ftask_force_report (5 December 2007).

Møller, Bjørn. "The United Nations as a Security Political Actor - with a Special Focus on Africa - DIIS." Danish Institute for Internationals Studies. <http://www.diis.dk/sw17478.asp> (24 October 2007).

Ndegwa, Stephen N.. *The Two Faces of Civil Society: NGOs and Politics in Africa (Kumarian Press Books on International Development)*. Hartford: Kumarian Press, 1996.

Obasi, G.O.P.. "African Water Journal." African Regional Water Resources Information System. <http://www.uneca.org/awich/> (21 January 2008).

Page, Edward, and Michael Redclift. *Human Security and the Environment: International Comparisons*. London: Edward Elgar Publishing, 2002.

"Paul Simon Water for the Poor Act 2005." US State Department; Under Secretary for Democracy and Global Affairs: Bureau of Oceans and International Environmental and Scientific Affairs. <http://www.state.gov/g/oes/water/> (6 December 2007).

Paulete, Panchita. "Practice and importance of combining health/hygiene and environmental education with water sanitation for sustainable health benefits in rural areas." Resources and Links about Peace Corps Master's International Program. http://www.cee.mtu.edu/peacecorps/documents_july03/hygiene_education_FINAL.pdf (3 December 2007).

Ploch, Lauren. "Africa Command: U.S. Strategic Interests and the Role of the U.S. Military in Africa." Congressional Research Service Reports. <http://www.fas.org/sgp/crs/natsec/RL34003.pdf> (24 November 2007).

Sciubba, Jennifer. "The Defense Implications of Demographic Trends." *Joint Force Quarterly* 1st Quarter (2008): 121-128.

"Senator Paul Simon Water for the Poor Act 2005 (P.L. 109-121) Report to Congress June 2007." U.S. Department of State - Home Page. <http://www.state.gov/g/oes/rls/rpts/85873.htm> (4 January 2008).

Sherbinin, Alex De, and Victoria Dompka. *Water and Population Dynamics: Case Studies and Policy Implications (Report of a Workshop, October 1996, Montreal, Canada)*. Washington: American Assoc For The Advancement Of Science, 1998.

Simons, Janet, Donald Irwin, and Beverly Drinnien. "Maslow's Hierarchy of Needs." Honolulu Community College.
<http://honolulu.hawaii.edu/intranet/committees/FacDevCom/guidebk/teachtip/maslow.htm> (5 November 2007).

Turton, Anthony , and Jeroen Warner. "Exploring the Population / Water Resources Nexus in the Developing World." Woodrow Wilson International Center for Scholars.
<http://wilsoncenter.org/topics/pubs/popwawa4.pdf> (2 December 2007).

Tvedt, Terje. *Angels of Mercy or Development Diplomats?: NGOs & Foreign Aid*. Trenton, NJ: Africa World Press, 1998.

Vig, Norman, and Regina Axelrod. *The Global Environment: Institutions, Law, and Policy*. Washington, D.C.: Congressional Quarterly Books, 1999.

"Water Conflict and Cooperation: Looking over the Horizon ." Woodrow Wilson International Center for Scholars.
http://www.wilsoncenter.org/index.cfm?fuseaction=news.print&news_id=22578&stoplayout=true (14 December 2007).

Watkins, Kevin. "Fighting climate change: Human solidarity in a divided world." Human Development Report 2007/2008. <http://hdr.undp.org/en/reports/global/hdr2007-2008/> (12 November 2007).

Weiss, Thomas, and Leon Gordenker. *NGOs, the UN, and Global Governance (Emerging Global Issues)*. Boulder: Lynne Rienner Publishers, 1996.

Yao, Michel. "Health and Epidemics in the Horn of Africa Region." World Health Organization.
http://www.who.int/entity/hac/crises/international/hoafrica/sitreps/HoA_Health_and_Epidemics_22_24Nov2006 (6 March 2008).

